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DATA AND INFORMATION NEEDS FOR RESEARCH RESOURCE MANAGEMENT

Report of a Special Working Group

International Development Research Centre
Nairobi, Kenya

June 1992

MANDATE AND MEMBERSHIP OF THE SPECIAL WORKING GROUP

Mandate

(a) to determine data and information needs for research resource management in the region;

(b) to recommend the strategy and standardized methodology and procedures for collection, collation, analysis and update of data on research resources in national institutions in Eastern and Southern Africa

Membership:

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TABLE OF CONTENT

Appendicies

ACNOWLEDGEMENT

On behalf of the Working Group on Data and Information Needs for Research Resource Management in National Research Institutions in Eastern and Southern Africa, I wish to acknowledge the tremendous support we have enjoyed during the course of our work from individuals both in Nairobi and Ottawa IDRC offices. The Working Group owes a debt of gratitude especially to Mr. Pierre Sane, Regional Director and his predecessor Dr. Daniel Adzei Bekoe, Dr. Paul B. Vitta, Deputy Regional Director in Nairobi and Mr. Andrew O. Asibey, Planning Officer in Ottawa for having supported this project and particularly for mobilising funds to enable tho Working Group to undertake this useful exercise.

During the planning, organisation and execution of the Working Group meeting, Ms. Lucy Kimani worked with devotion to ensure its success. Her invaluable assistance is deeply acknowledged.

Zerubabel M. Nyiira
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SUMMARY

The Working Group on Data and Information Needs for Research Resource Management in Eastern and Southern Africa was established on recommendation of the Regional Workshop onn Research Resources in National Research Institutions in Eastern and Southern Africa held in Nairobi, Kenya from 22-24 july 1991. It is composed of 6 people from the region selected on the basis of their knowledge and experience in the area of research resource management in national research institutions and two IDRC officials. Its mandate is to:

(a) determine data and information needs for research resource management in the region;

(b) recommend standardized methodology and procedures for collection, collation, analysis and update data on research resources in national research institutions in Eastern and Southern Africa.

The membership of the Working Group is indicated on page 1.

The Group held its first meeting at the Nairobi Hilton Hotel, Kenya, from 11-13 May 1992 to:

1. identify data and information essential for research resource management in the region with a view to developing long-term databases for R&D planning, organisation and evaluation;

2. identify parameters and variabales required for planning R&D, detecting progress in R&D nstitution building and evaluation of the performance of R&D institutions;

3. identify mechanisms for improving procedures for access to data and information in national research institutions for the purpose of developing long-term databases for research resource management;

4. recomend follow up strategy and action plan for improving the status, quality and utilisation of data and information for research resource management in the region especially in the framework of networking.

The meeting was opened by Dr. Paul Vitta, Deputy Regional Director, IDRC, EARO on behalf of the Regional Director, Mr. Pierre Sane. Mr. Andrew Ker, Senior Programme Officer attended the meeting on invitation.

After reviewing the critical factors influencing data and information needs for research resource management in national research systems, and the appropriate mechanism as well as the procedure for survey, collection, processing, storage and dissemination of data and information on research resources in the region, the meeting agreed that data and information have a critical role not only in planning and organisation of research but also in monitoring and evaluation of research processes and the productivity of national research systems; thus facilitating research managers, planners and policy designers to make the reguired decisions, selecting the most appropriate of the alternative research resource management measures and using them.

It was agreed that data and information needs for research resource management change. They have to be constantly reviewed and updated. Databases have to be created and revised from time to time in light of evolving information. Equally important is the need for effective coordination of the effort to collect and process the data and exchange information on research resources and their management in the region. In this regard the Working Group considers its task as intended to accomplish a continuous and long-term objective.

Taking these considerations into account, the Working Group recommends:

1. That, specific effort should be made through sensitization seminars, and training and orientation forums to create increased awareness of the important role of data and information in planning at macro and micro levels in both national and international development systems as well as in the planning and organisation of research resources and the implementation and evaluation of research programmes.

2. That, effort should be mounted to build and improve the capacity of national research institutions to assemble and process data and information essential for effective management of research resources in national research systems.

3. That individual national research institutions should be encouraged to form themselves into national research resource data and information management networks and to develop projects for improving research resource data and information management and utilisation.

4. the creation of regional subnetwork on information and data for research resource management as part of the proposed regional research resource management network

for Eastern and Southern Africa. The Working Group should continue as the management and advisory instrument of the subnetwork.

5. That, IDRC should finance a pilot study whose objective is to test the efficacy of the refined survey instrument.

6. That, in view of increasing importance attached research resource management IDRC should consider appointing or at least assigning an officer to sensitize R&D managers on research resource management, coordinate the activities of the Working Group in the region, facilitate networking on data and information collection, and dissemination, assemble data and information on joint efforts on research and develop initiatives which might facilitate exchange of research resources as well as interaction and collaboration among scientists and institutions within the region.

The Working Group appreciated the need for developing instruments for measuring research productivity . It recommends that the subject be discussed by the Working Group at another meeting.

BACKGROUND

The Regional Workshop on Research Resources in National Research Institutions in Eastern and Southern Africa organised in Nairobi, Kenya, from 22-24 July 1991 recommended as follows:

(a) that, in view of the importance of information and communication in planning and development of capacity building strategies, measures should be taken by national institutions and international development agencies to strengthen information and communication management systems in national research institutions. National research research systems should establish mechanisms for identification, collection, processing, storage, dissemination and effective utilisation of information and data on research resources in their systems.

(b) that, national research systems be assisted in developing decision making information support systems to facilitate administration and management of national research institutions. Consideration be given by IDRC to organise a planning workshop to exlore the possibility of establishing a regional management information systems(MIS) network on various research resources, programmes and cooperation.

(c) that, as a follow up action, a small working group should be established to work out data and information needs for research resource management and draft information and data survey instrument for evaluation of national research resource capacity which will be subject to refinement, and field testing and update.

IDRC considered these recommendations and established a special Working Group composed of 8 persons(page i) to determine data and information needed for research resource management in national institutions and recommend a strategy for institutionalising its collection, processing, storage and dissemination and the standardisation of methodology and procedures for its collection, analysis and update.

Good quality data and information are a major factor for effective management of research and development (R&D) systems.

At the institutional level, research managers cannot plan, monitor or evaluate research without information on specific research programmes and activities. They must know what research is being done, with what resources, the quality of resources employed, and what resources are available or will

be required for planned research. Scientists cannot develop sound research objectives and plans without adequate background information and data to justify indulgence in specific investigations. They need information on resources (personnel, financial, equipment, land, laboratory, office space) available to them before they can plan, organise and implement their research activities. Availability of data and information allows both the research managers and scientists to improve planning, programming, monitoring and evaluation of research.

At the national level, R&D and overall science and technology policy cannot be set without information and sound data on which to base decisions. The use of management information systems allows national policy designers, development planners and economists to assemble diverse information on research resources and use it to effect sound national plans and assess the potential performance of technology-base development projects. Research managers and resource administrators can use information and data to fight for more resources, policy change and international finanacial and policy support.

Data and information are a national resource whose use must be promoted in regional and international development and cooperation. The implication of this endeavour is clear. Data and information on national research resources can facilitate the development of strategies for information technologies and regional as well as international cooperation and linkages in R&D.

Specifically, data and information is needed in research resource management for:

(a) planning research and monitoring changes in national research systems;

(b) understanding processes taking place in response to or keeping towards institution building efforts; and

(c) developing and testing capacity building models with predictive capability.

Unfortunately, data sets in the area of research resource management are few in number, information is scarce, and the quality of both is poor. There is clear need for improvement in all aspects of information and data collection, assembly, management, distribution and utilisation.

CONCEPT AND PURPOSE OF DATA AND INFORMATION IN RESEARCH RESOURCE MANAGEMENT

The Working Group considers an inquiry into the concept and purpose of data and information in research resource management important in developing research resource indicators especially for planning and evaluation of research resource input and productivity of research systems. When these aspects are clear, survey instruments can be developed that can qualify and quantify research resources and relate them to investment benefits in the shorterm and longterm.

Two problems are, however, evident. Data relates to measurement where precision is an important factor. For the purpose of reliability and comparability data on research resources is a central consideration. Some of the resources including information itself may be unquantifiable. Information, on the other hand, relates to understanding of the situation. It may be subjective lacking precision and objectivity but playing an important part for decision making in the management of research resources. Information can also be objective and measureable; data itself is a subset of information. These two concepts lead to the need for survey and analysis methods which must collect and process comprehensive data and information both objective and subjective and make the best use of it. The composition and structure of the survey instrument should permit this to be achieved.

Inspite of such conceptual hitches, it is the adequacy and interpretation of available information and statistical series that present problems. Such information as "after service for and maintenance of equipment are generally good" is difficult to measure let alone interprete in comparative terms. In constructing a refined survey instrument there is need for developing questionnares with precise statements and questions which will compel the respondent to provide expected information. The resource indicator selected for measurement of some information and subsequent analysis of that information should be able to reflect the limitations of the information obtained.

CRITICAL FACTORS INFLUENCING DATA AND INFORMATION NEEDS FOR RESEARCH RESOURCE MANAGEMENT IN NATIONAL RESEARCH INSTITUTIONS

The lead in consideration of critical factors influencing data and information needs for research resource management came as a result of problems encountered in establishing baseline data and information essential for planning, organisation and evaluation of research and when such parameters were necessary in these processes.

Survey and collection of research resource data and information requires firstly, a basic understanding of the circumstances which determine the specifics of management of those resources and influence research resource use decisions. Secondly, the research resource management system needs to be viewed in totality in order to understand the connections and interactions between research resource needs. Thirdly, research resource management involves not only resource inputs but also resource outputs and their subsequent dissemination and utilisation. In developing comprehensive research resource survey instruments recognition must be given to this factor. Fouthly, research resource survey must start and end with scientists themselves and focus on aggregating the information to obtain the picture of resource status at the programme and institutional levels and subsequently at the national regional and international levels.

Several institutions have attempted to develop research resource indicators in the region but none of them has managed to obtain exhaustive information. Part of the reason for this shortfall, understandably, lies in the fact that research resource needs are dynamic. They change with changing research emphases and time. Consequently, there is need to establish, in general terms, what factors play a crucial role in influencing the changing research resource needs in specific research systems.

The IDRC Working Group addressed this subject of research resource needs from the point of phases of the research process which are also tasks performed in the research system namely planning, organisation, direction, control and evaluation of research. Such an approach was accepted by the Working Group as a reasonable strategy in identifying specific variables that have bearing on the type, quality and volume of data and information that play a useful role in research resource management. Information on identified variables can be compiled in form of data bases thus allowing rapid reference to them when analysing the input of research resource data and information on research performance.

The following is a set of factors conceived to have influence on the type and quality of data and information essential for research resource management:

(i) the research mission - what the institution is meant accomplish within the overall national goal. Information on both the national and sectoral policies together with aims and objectives of the institution is relevant to this consideration;

(ii) concept of data and information is needed and the purpose for which it is needed;

(iii) levels at which the data and information is needed (scientist, institutional, national, regional, international);

(iv) geographical coverage; different sets of data and information are needed for planning and execution of research in varying geographical conditions in which case different parameters will be needed for planning, organisation and deployment of research resources in the different geograpahical areas;

(v) Availability and obtainability of research resource data and information. Only when what is available is known can decisions be made on what is needed, what is accessible and what is unobtainable;

(vi) composition and structure of accessible data and information;

(vii) extent and type of linkages to facilitate access to available information and ease of accessibility.

(viii) client needs; this is an important consideration in because information is useful if only it is used at one time or another. It is necessary to establish current and future client needs so as to look for the appropriate data and information from relevant sources.

(ix) time scale is another important factor to consider. Research resource data needs change with time according to purpose. National plans usually lack consideration of time frame with regard to what is expected out research resource inputs. Conventional economics is badly equiped to deal with such time scales partly because it relies on the concept of quantifiable return which in the case of research resource inputs may be realised a generation or two after research resource investment.

(x) adopted economic system will influence the type of research resource data and information needed especially for research planning. For example, taxation in a specific economic system will affect resources available for research.

(xi) the economics of research have continued to be a controversial factor influencing research resource needs. Research bears direct and indirect benefit to the economy. Some of the benefits, though research-based are attributed to other sectors of the economy. For example, the development of hybrid maize is a science and technology research and development product but the benefit of this innovation is reflected in agricultural production levels whose credit goes to the agricultural extension service. The concept of higher returns for an investment should, therefore, be compensated when considering research resource inputs and outputs. Some of the returns are longterm.beyond the stretch of modern economics

This listing of critical factors is not according to order of priority; the weighting of each of them will depend on levels of consideration and circumstances mitigating research resource needs.

An understanding of the factors influencing data and information needs for research resource management is critical in research management and administration. Knowledge of these factors can help explain the current research resource management practices as well as decisions about changes in style of managing research resources.

DATA AND INFORMATION NEEDED FOR THE MANAGEMENT OF RESEARCH RESOURCES AT SPECIFIC LEVELS

Different levels of research resource management require varying types of data and information to plan, organise and execute specific tasks. These requirements are determined by the mission/goal to be accomplished, the method and procedure to be used to accomplish specific objectives, knowledge of what data and information is needed accessibility and obtainability of the requirements. The information regarding resource needs and requirements of specific levels is usually comprehensive. It is impractical to expect an exhausitive list of these needs but there are baseline reserch needs which each level must expect to have before investing time and effort in planning or execution of any task. This discussion is focused on imperative resource indicators at the scientist, institutional, national and international levels.

It should be noted, however, that the effective starting point for research resource data and information survey is at the scientific activity level. It is at this point that comprehensive resource indicators should be compiled and when aggregated will furnish the research resource status of programmes, institutions and national research systems, from which subsequent regional and global indicatoars can be established. Obviously, each level will have different sets of data and informtion because of unique circumstances at that level, but it is believed that there is basic data that can either be divided or aggregated into information desirable at other levels. Consequently, methodologies and procedures that seek to obtain data and information on research resources should be as comprehensive as possible at the specific activity and programme levels in terms of components and clarity.

1. Scientist Level:

The following data and information is needed by scientists to plan, organise and implement research projects and activities:

- national development plan,
- national and sectoral policy statements
- institutional mandate
- programme goal
- broad aim of project or activity
- finances available for project/activity (level, mode of distribution)

- manpower strength available for project or activity (categories, capabilities, emoluments, time and period of availability)
- equipment available for the project/activity (type, number, capacity, make, source, cost, manageability and technical know-how to handle equipment, service and maintenace facilities)
- time scale for execution of project/activity and timing of activities
- land availability(for field experiments and trials)(area, quality, distance from institute, terms of tenure)
- structures(office and laboratory space, housing accomodation)
- potential clients of research output and their location
- literature and library information
- socioeconomic information and indicators
- linkage mechanisms (real and potential) for diffusion of research output

The resource indicators needed at the programme level are essentally the same as those for the scientists level but aggregate for all projects and activities of the programme. In addition, indicators of research resource management capabilities are essential to facilitate planning of training requirements. A programme resource inventory is essential at this level. At the programme level data and information on cooperative projects and activities is also essential as well as national and international clients of programme output.

2. Institutional Level:

The research resource requirements of an institution is a total sum of resource needs of all programmes and institutional activities. However, there are unique resource data and information needs at the institutional level. In this regard, therefore, the diagnosis and design of the methodology and procedures for survey of resource indicators at this level should, in addition to considering the parameters relevant at the scientists and programme levels, include data and informtion on the following:

- administrative capacity(personnel categories, numbers, capabilities/qualifications, deployment status, age, sex, terms and conditions of service including emoluments, nationals and non-nationals,
- non-scientific technical support staff(categories, qualifications, non-formal training achievements, schemes of service
- status of scientific equipment(number, capacity, quality, cost, source, manageability, utilisation levels)

- non-scientific equipment inventory(number, capacity, utilisation level, make, source, cost, persons incharge, serive and maintenance facilities)
- project inventory(number and type of projects and their location together with resource indicators on those project activities)
- library capacity
- office, laboratory and housing accomodation capacity
- physical plant capacity(type, capacity, source, cost, location, technicians incharge)
- external cooperation and linkages(projects/activities and objectives, project/activity costs, institutions/countries, commencement date, duration, location)

Manpower inventory at the institutional level must be biographically comprehensive and quite detailed to permit indepth analysis for the purpose of manpower development planning.

The institutional level is crucial in assembly of data and information for research resource management. It is clear from the set of data and information needed at the scientific activity, programme and institutional levels, that the majority of all the statistics and general information needed for research resource management can be collected within the institution from where it can be made available to national, regional and international clients. Moreover, institutional directors are empowered to develop strategies and mechanisms for planning and directing activities of institutional interest or national concern. Since data and information are national resources, institutional management can be sensitised and facilitated to construct strategies and mechanisms collecting, processing, storage and dissemination of critical research resource indicators.

There are other valid reasons for having research resource assessment carried out by institutional administration. Advantages that can be provided by this approach include:

- assured support for the execution of the task;
- collective objectivity;
- decreased duplication of effort;
- coordinated data collection and the use of data collectd by other agencies
- sharing of data and information is easy.

3. National Level:

Data and information needed at the national level is the aggregate of statistics and other relevant information of general nature from the various national research

institutions. However, because of the unique requirements for information essential for socioeconomic development planning, extra information is essential. This includes the following:

- national strategic plans
- policy statement on resources, instrumentation, finance and other resources on science and technology and especially on R&D.
- institutional reports
- research resource status reports from institutions
- register of microprojects
- information and data on collaborative activities
- library and documentation linkage system
- matrix of institutions and economic activities
- information on foreign policy

4. Regional Level:

The following information is useful for planning research resources at the regional level:

- national development plans
- national research resource status reports
- national sector and institutional reports
- national socioeconomic indicators
- data and information on national political economies
- historical perspectives on regional cooperation
- inventory of existing and past economic and technical groupings(both government sponsored and professional bodies). Information on groupings should be disaggregated into regional and subregional, and determine whether these groupings have/had clear statements that relate to science and technology research and development.
- inventory of international development organisations

5. International Level:

Individuals and institutions concerned with research resource planning and utilisation at the international level would particularly be interested in the following information in addition any that might be available at other levels;

- national development plan
- regional cooperation activities
- national sector reports
- reports on national research resource capacities
- national and regional socioeconomic indicators
- sociopolitical indicators and political economy perspectives
- inventory of international development agencies and donors

and the sectors they support, level of support provided, cooperation among themselves
- national and regional research project inventories

The nature of this information and the data relevant to these topics underscores the role of effective centralised data and information services

GUIDELINE FOR SURVEY AND COLLECTION OF DATA AND INFORMATION ON RESEARCH RESOURCES IN NATIONAL RESEARCH INSTITUTIONS

The Working Group examined the data and indicators essential for research resource management keeping in mind the specific needs of various levels of user groups and concluded that these should include the following:

Human Resources:

1.Data and information on human resources should include biographical parameters, deployment and education and trainig details:

(a) Biographical data

- name
- title
- address- box, telephone, telex, telefax
- age and date of birth
- sex
- father's/mother's name(s)
- education background(formal education, certificates and diplomas obtained)
- area of specialisation
- training after formal education(type, certificate and diploma awarded or any other recognition given)
- appointment and subsequent promotion dates (first and subsequent appointments- dates)
- terms service(permanent, contract)
- current position and when appointed to it
- salary scales and other emoluments and effective dates
- postings(location, institution, division, date posted)
- previous postings(location, institution, division, date)

(b) Deployment:

- location
- programme
- project
- activity
- time utilisation:
  - % research, teaching/training, advisory, administration/management, laboratory, library literature review, field work etc)

- % of research time on basic research, applied research, operational research, multidisciplinary research, discplinary research, extension of research output
- % time on national/international seminars and conferences
- % time with clients of your research (policy designers, planners, practitioners, donors, international development teams etc)

- number of projects proposed, accepted, successfully completed, where individual was principal investigator
- number of reports
- publications written(in journals, books, book chapters, abstracts, conference/workshop/semianr proceedings
- number of of people supervised: researchers, technicians, others(specify)

(c) Inservice Training:

- most recent training and previous inservice training- both local and foreign-(institution, location, subject, duration, cost funding source)
- ongoing or proposed training activities(subject, institution, country, duration, timing, funding source

Some human resource indicators can only be compiled by the institute administration. This includes:

- staff mobility and migratory patterns
- administrative capability(extractable from human resource statistics)
- numbers of national and expatriate personnel

Financial Resources:

Statistics on financial resources are best extracted from current and past workplans. Generally, it should include the following parameters:

(a) Budgets:

- institutional budgets broken down into activity, project, programmes, recurrent(operating) expenditure, capital or development expenditure
- distribution of research budget(who distributes, at which level is it disbursed, how much goes to scientific and nonscientific research activities)
- allocations(according to activity, project, programme, discpline, commodity)

- allocations(according to purpose e.g.salaries, allowance categories, equipment, material, service(water, electricity, telephones, telexes, telefaxes etc), transport, medical expenses etc)
- source of research funding by sector, programme, project, research area, service, other categories
- source of funds for any nonresearch activities eg. product processing equipment

(b) Projects and Activities:

- list of current projects, duration and budget

Physical Resources:

With regard to physical resources the following variables are relevant to their management in national research institutions:

(a) Equipment:

- inventory of critical scientific equipment(type, age number, value, procurement procedures, technical supervision, serviceability; availability of spare parts, catalogues; provision of maintenance teams and facilities)
- inventory of equipment utilisation(operational time, time out of service/reason; availability of control register(for safety and assessment of utilisation)
- inventory of income generating plants(eg product processing or production line plants, etc)
- availability and adequacy of after-sales service

(b) Transport:

- inventory of vehicles(type, number, age, source(aid etc) serviceability, availability of spares, replacement schedule)

(b) Consumable material:

- inventory of major consumable material and supplies(quantities, costs, regular and alternative suppliers)
- procurement procedures

(c) Building structures:

- adequacy (laboratory, office, library, conference, store, utility space).
- availability and adequacy of staff housing(numbers, area, quality, distance from main research centre)

(d) Amenities:

- amenities(availability and adequacy of recreation, school and medical facilities, provision of houses of prayer)

Information as a Resource:

- library(space, general description of content and capacity)
- library budget(categories expenditure: books, journals, photocopies, etc)
- cooperation and linkage(type of cooperation and linkage, membership to networks etc, institutions providing exchange service, donations, support funds/level provided, etc)
- adequacy of facilities for information storage and retrieval(where and how data is collected, processed, stored and disseminated)
- quality of information(accuracy, uniformity, completeness, validity, timeliness of availability, comparability, cost effectiveness in relation to collection processing storage and dissemination)
- quantity and content(all levels of relevant journals, bibliographies, abstracts, video tapes, conference papers and reports, databases, communication facilities, electronic mailing systems, internal papers, seminar proceedings)
- main (primary secondary) sources of library material
- user categories, user needs, dissemination mechanism

Time as a Resource:

Time is an important resource which must be effectively managed in national research activities. Projects have time scale: timeliness of events is another consideration, the cost effective of time is equally relevant. Time must be planned and there should be time resource indicators which can be collected as part of human resource or financial resource assessment. For research management purposes the following information would be useful:

- cost of time spent on an activity
- documentation of achievements against time scales
- time indicators for planning and programming activities within a research institution including board meetings, budgeting exercises, production of reports, programme reviews, staff appraisal, committee meetings, ad hoc meetings, holidays.

- duration, deadlines, critical starting and completion time
- time audits(efficient and effective use of time)

Orientation is necessary for new employees with regard to time management as an important culture an institution and individual must develop.

Questions and interviews on time should be carefully framed so as to get required information without causing suspicion among respondents

Cooperation and Linkages:

Data and information essential for the management of cooperatoin and linkages include the following:

-extent of linkage(with users, user groups-extension agencies, industry(in country outside country and where)
- names of institutions in collaboraton with or linked to activities or programmes in an institution, nature of linkage, duration, type of institution(academic, research laboratory, R&D institution)
- number and list of projects involving collaboration (between national institutions, between national and regional or international organisations)
- % of research or non research projects under collaboration; introduced to the institution, requested from outside, generated and proposed by the institution for collaboration
- level of research support through collaboration (manpower, financial, information provision etc)
- extent, type and level of cooperation among external agencies in country
- extent and type of cooperation for sharing research resource
- plans for cooperation(research or resource sharing)

INSTITUTIONAL FRAMEWORK AND PROCEDURE FOR COLLECTION, STORAGE, PROCESSING AND DISSEMINATION OF DATA ON RESEARCH RESOURCES MANAGEMENT

An efficient institutional framework and procedure for collection, storage, processing and dissemination of data and information on research resources is neded for effective planning, development and utilisation of research resources. There are three main considerations:

(1) organisation of data and its collection, processing and delivery at the individual scientists level;

(2) the procedure for aggregation, processing, storage and dissemination at the institutional level of data and information received from individuals, programme leaders and institutional heads;

(3) the availability and utilisation of data and information on research resources at the regional and global levels.

National research institutions need to have commitment, organisational framework and means to collect needed data and information.

Heads of research institutions, in this regard, have the responsibility to demand from programme leaders and individual scientists to provide information on research resources and their management at the programme and individual scientist levels. Once the tradition of data collection and processing at these leveles is well estabilished there will be an assured source of raw or partially processed data. This exercise can be incorporated in routine information collection such as annual report preparations and annual institutional performance assessment exercises.

Since data and information are a national resource, there should be in each country a national reference institution preferably national councils of science and technology or other appropriate umbrella body responsible for national R&D activities which ideally should collect, aggregate or disaggregate information, as the case may be, store and disseminate information on research resources at the national level. It is at this point the Working Group considered national data and information networks as appropriate mechanisms for this purpose. Research and development institutions in a particular national system would form themselves into a network, identify common objectives and aspire to achieve them through joint network effort.

At the regional level, the Working Group encourages the creation of a regional mechanism for promoting and coordinating national efforts aimed at improving the methodology and procedure for collecaation, analysis, storage and utilisation of information and data for research resource management in the region. The Working Group sees this objective fulfilled through a collaborative effort in form of networking. For this purpose the Working Group advocates for formation of a regional research resource data and information subnetwork within the broad framework of the already proposed Research Resource Management Network for Eastern and Southern Africa.

The foregoing analysis suggests that national R&D institutions are the pivotal point for data and information collection and processing. Major effort should, therefore, be invested in sensitizing directors of research institutions and programme leaders to appreciate more the essential role of data and information in research management and their individual and collective role in ensuring successful collection, processing and storage of data and information.

The second priority should be placed on encouraging the establishment of institutional units for collection, processing and storage of data and information on research resources or strengthening those units which already exist. These will eventually form nodal points for national data and information networks.

Thirdly, it is vital to support the creation of research resource data and information networks as mechlanisms for evolving national research resource data and information banks and reference institutions. The main objective of these networks will be to cordinate and strengthen institutional efforts for the collection and processing of data.

Lastly, at the regional level, the research re source and information regional subnetwork will emphasise the promotional and coordinative role and ensure that standard methodology and procedures are employed in the collection and analysis of information.

RECOMMENDATIONS

Training

The critical point for research resource management data and information collection, processing and dissemination is at the institute level. It is at this level that managers can demand scientists and programme leaders to collect and make available data and information on specific research resources at activity, project and programme levels which in turn can be aggregated to reflect the status of research resources at the institutional level. The Working Group, therefore, recommends:

> That, specific effort in form of sensitisation seminars and training and orientation forums should be mounted to
>
> (a) create increased awareness of the important role of data and information in macroplanning at the national and international levels as well as in planning and organisation of research resources and in the implementation and evaluation of research programmes;
>
> (b) build and improve the capacity of national research institutions to assemble and process data and information essential for effective management of research resources in national research systems.

Networking

The Working Group acknowledged and endorsed the idea of networking in implementing mechanisms for improving the status of data and information for research resource management in Eastern and Southern Africa. To this end the Working Group recommends:

> That, individual national research institutions should be encouraged to form themselves into national research resource data and information management networks, and to develop articulate projects on research resource data and information management and utilisation.

In this regard, the Working Group encourages the creation of a regional mechanism for coordinating national efforts aimed at improving the methodology and procedures for collection, collation, analysis and storage of information and data for research resource management as part of the proposed regional research resource management network for Eastern and Southern Africa. For this purpose, the Working Group

could continue as a coordinating, advisory and advocacy instrument of the proposed regional data and information sub-network

Field Testing and Validation of the Refined Instrument

The purpose of refining and updating the data and information survey instrument is to ensure that it meets the requirement and longterm objective of obtaining comprehensive data and information that will play a critical role in improving the productivity of national research systems and the design of national development plans. There is need for validating the updated survey instrument through practical field tests in selected national research institutions. The Working Group, therefore, recommends:

> That, as a start, IDRC should finance a pilot field study whose objective is to test the efficacy of the refined survey instrument. Members of the Working Group should act as coordinators of the study at national level and meet again in April 1993 to review the outcome of the study, determine future direction of initiatives on research resource data and information management, and review any proposed workplans and budgets from emerging national networks.

Coordination

The Working Group considers this emerging activity of data and information management as quite important to warrant specific attention. At the same time, both the art and practice of research resource management have now recognised as important elements of research management and are being implemented by various networks and institutions in the region. It is essential that the efforts of these various institutions including the training of research managers in information management systems and the current initiative by the Working Group on collection, collation and analysis of data and information for research resource management be effectivelly coordinated. The Working Group, therefore, recommends:

> That, IDRC should appoint or at least assign an officer to:
>
> (a) coordinate the activities of the Working Group in the region,
> (b) sensitize R&D managers on research resource management, and
> (c) facilitate networking, and

(e) assemble information and data on joint research efforts within the region and develop a programme which might facilitate exchange of research resources as well as interaction and collaboration among scientists and institutions within the region.

FOLLOW-UP ACTION PLAN

The Working Group recommended the following follow-up actions:

1. That, two regional training workshop on methodology and procedures for survey, collection and processing of data and information on research resources in national research institutions be mounted in December 1992 and July 1993. The objective of the training workshops is to create a trained cadre of people in national research systems and institutions who will take lead in implementing the task of research resource management data and information collection and processing. The estimated budget for each of these activities is indicated in Appendix #4 (A).

2. That a sensitisation seminar for Directors of Research Institutions be organised in Dar es Salam in April 1993. The Working Group will take advantage of the seminar to meet at the same time and place and to evaluate the effectiveness of the seminar. The budget for the seminar is approximately US$39,550 (Appendix #4(D)

3. Headstart national projects for collection and processing of data and information for research resource management projects should be initiated soon after validation of survey instrument and the initial training of national in methodology and procedures for survey, collection and processing of data and information on research resources in national research institutions. The selection of the number of countries for participation in the project and the specific institutions is left for IDRC to decide. The cost of such initiative is indicated in Appendix #4(B).

3. To implement the Working Group recommendation on establishment of a regional coordinating machinery for research resource data and information subnetwork, an indicative budget is given in Appendix #4(C). IDRC should consider implementing this recommendation as soon as possible.

4. Field testing and validation of the refined survey instrument should commence in September 1992 in countries which were involved in the initial exercise where baseline data is already available. These include Kenya, Uganda, Tanzania, Mozambique. Because of difficulties experienced during the initial exercise in Zimbabwe, it can be substituted by Botswana. Mauritius should be included because of assured supervision.

Appendicies

Appendix #1.

WELCOME ADDRESS

by
Dr. Paul B. Vitta

The Working Group Meeting was officially opened by Dr. Paul B. Vitta, Deputy Regional Director, Internatinal Development Research Centre, Eastern and Southern Africa. In his opening remarks, Dr. Vitta indicated that the meeting gave him the privilege of renewing aquaintance with old colleagues and establishing new friends. He assured the Working Group of the IDRC support since the subject matter the Group was handling was important to IDRC.

He stressed that justification of research projects and dfense of project proposals need to be quantitative especially given that donors keep data and related them to requests for funding. He expressed regret that it is not easy to get precise figures on national research resources partly because they are often regarded as confidential and are not easy to come by. In other cases, there are no records kept on resource investment in research. He pointed out that if a system does not know what resources are available for planning and execution of its programmes it cannot plan and will remain in a dream. He further observed that, for economists to establish returns on research investment it important that records be kept and data processed on research inputs.

Dr. Vitta advised that comprehensive databases on research resources should be developed because it is easier to subtract from detailed information by lifting only what is needed than to add on what information is available. He urged the Working Group to give much consideration to developing a strategy for institutionalising research resource data and information management in national research systems so as to improve accessibility to data and facilitate advocacy and decision making at different levels of research and development (R&D)support.

He concluded by wishing the Working Group successful deliberations and assured the meeting that IDRC was looking forward to their proposals and recommendations.

Appendix #2.

DRAFT DATA AND INFORMATION SURVEY INSTRUMENT

TOPICS TO BE COVERED

1. Human Resources
   - 1.1 Number of staff: scientific, technical, non-technical(administration or support staff education/qualifications, specialisation and skills
   - 1.2 Number of national and expatriate scientific and technical staff, contract and temporary
   - 1.3 Scientific, technical and semi-skilled support staff engaged in research by research sector(discpline, commodity or research area)
   - 1.4 Percentage of time devoted to research, teaching/training, technology extension, administration/management
   - 1.5 Percentage of research time devoted to library/literature scanning, attending technical and non-technical meetings, conferences and workshops
   - 1.6 Percentage of time spent on planning and budgeting ofresearch activities, programme reviews and production of research reports

2. Financial Resources
   - 2.1 Total annual institutional budget and breakdown of funds allocated to research programmes, administration and operating costs, capital expenditure
   - 2.2 Distribution of research funds by sector/programme/activity(scientific, non-scientific)
   - 2.3 Institutional funding by sources: national(public and private) and external
   - 2.4 Source of research funding by sector/commodity /discpline or research area
   - 2.5 Listing of projects and source of funding

3. Physical Resources
   - 3.1 Listing of critical scientific equipment and physical plants(type, age, utilisation and maintanance facilities
   - 3.2 Inventory of major consumable material and supplies(quantities and cost)

3.3 Number and size of laboratories, offices, library and staff houses
3.4 Provision of amenities(school, medical unit, recreation facility

4. Information Management

4.1 Annual library budget
4.2 Listing of main sources of library material
4.3 Type and number of library equipment
4.4 Linkages and cooperation(network membership, exchange services etc)

5. Cooperation and Linkages

5.1 Number of projects involving research collaboration with national and non-national(R&D, private firms, academic, donor)institutions
5.2 Nature of collaboration/linkage (national, regional, international)
5.3 Level of research support through collaboration (manpower, financial, information provision etc)
5.4 Number of projects by type of collaboration (technical assistance, training, joint research, staff exchange etc)
5.5 Duration of collaboration/linkage
5.6 Percentage of research or non-research projects under collaboration introduced to the institution or generated/proposed by the institution for collaboration
5.7 Type and level of cooperation among external agencies in country

6. Clients for and Users of Research Output

6.1 Listing of institution's major clients (national and international)
6.2 Percentage of research projects requested by local clients, outside clients or conceived internally
6.3 Extent of linkages with clients and users of research output inside and outside the country

7. Factors facilitating and limiting research

7.1 Management structure
7.2 Policies
7.3 Macro-economic factors
7.4 Country size and resource base
7.5 Linkages with users of research output
7.6 Linkages with non-national institutions

DATA AND INFORMATION QUESTIONNARE

SECTION 1: Institutional Details

Name of Institution
Full Address
Telephone
Telex
Telefax
Status of institution(government institute or autonomous)
Date of establishment
Name and designation of head of instituton
Brief description and history of the institution(including mandate, location, organisational chart, institutional programmes and departments, major changes and reorganisations, major events etc)

SECTION 2:

(a) Number of Staff by sex, training and work category

Scientific(Ph.D, M.Sc, B.Sc, others)

Technical	No.	Qualification/ Training obtained
-Technologist		
-Technician		
-Skilled Technician		
-Unskilled Technical Support Staff		
Non-Technical		
-Administrative		
-Clerical		
-labourers	-	-

(b) Number of national and expatriate staff and terms of service

- Nationals:- Permanent
  - Contract
- Non-Nationals

	Technical Assistance	Consultant
Sub-saharan Africa		
Europe		
North America		
Others		

(c) Number of staff by research area, specialisation, activity or discpline e.g.

.....plant breeding/plant genetics
.....water irrigation and management
.....training
.....administration and finance
.....library and documentation
etc

(d) Average % of time devoted per week by individual researchers to various activites

	0-20%	21-40%	41-60%	61-80%	81-100%
- Research planning					
- Research Implementation					
- Library study					
- National Seminars and Workshops					
- Overseas conferences seminars and meetings					
- Review of reports and technical material					
- Administration/ Management					
- Training activities					
- Technology extension					
- Others(specify)					

(e) Deployment of Academic Qualification to Research Discpline or Activity: Number of Staff

	Ph.D.	M.Sc/MA (if equivalent-specify)	B.Sc/BA	undergrad. diploma
Plant Breeding/ Plant genetics				
Animal Breeding				
Plant Ecology				
. .				

SECTION 3:

(a) Annual Budget Breakdown

-Total Annual Institutional Budget
-Wages and Salaries Expenditure
-Utilities expenses(electricity, water, telephone etc)
-Maintenance costs

-Administration(general management and support) costs
-Research Operation costs*
-Training Costs
-Library Expenditure
-Capital Expenditure

* research operation costs comprise all research activity/project expenditure such as research equipment, research input, travel and per diem expenses, material, supplies and service expenses.

(b) Allocation of Budget by Research Area/Activity

Research Area/Activity vs Expenditure

(c) Sources and level of Funding
- Government subvention
- internal revenue
- Consultancies and Services
- Private Donations and Fundraising
- External sources(international donor agencies)

(d) Level of Sector Funding

	Agriculture	Industry	Health	Education	etc
Governmentt.					
Consultancies and Services					
Internal revenue					
Private Donations and fundraising					
External Sources					
Others(specify)					

(e) Listing of Specially Funded Projects and Funding Sources

Project Title	Budget	Duration and year started	Sector	Funding source	Inititated by (state)

SECTION 4:

(a) Inventory of Physical Resources

Equipment/ Plant	Type	year acquired	use/purpose	maintained/ serviced by (state)

(b) Inventory of Major Consumable Material

Name	Average Annual Quantity	Cost	Source

(c) Physical facilities

	Number	Capacity/size	Location*
Laboratories			
Offices			
Library			
Staff Houses			
School*			
Health/Medical Unit*			
Recreation facility*			

* indicate whether part of research institute on site or located near institute and distance

(d) Information and Documentation Facilities

-Main source of library material
-Type number and age of library equipment

SECTION 5:

(a) Listing of Projects Involving Collaboration with other institutions

Project Title	Name of national collaborating instn.	Name of non national collaborating institution	Nature of collaboration	Level of support	When started
	Initiated by (state)				

(b) Projects Jointly Sponsored by External Agencies

Project Title	Date Initiated	Nature of Project (training, etc)

(c) Listing of Projects involving linkages with clients and research users

Project Title	Name of Client/ Research User	Location	Description of Linkage*

* give brief description of how linkage was conceived(requested by client, introduced to client etc)

Appendix #3

PROGRAMME OF THE MEETING

SUNDAY, 10 MAY 1992

Arrival of members from Botswana, Mauritius and Tanzania

MONDAY, 11 MAY 1992

Chairman: Dr. B. N. Majisu
Secretary: Dr. H. M. Oranga

0900-0905 Hours :	Introduction : Dr. Z. M. Nyiira
0905-0915 Hours :	Welcome Address: Dr. Paul Vitta Deputy Regional Director IDRC, Nairobi, Kenya
0915-1000 Hours :	Analysis and Harmonisation of Terms of Reference
1000-1030 Hours :	TEA BREAK
1030-1245 Hours :	Review of Critical Factors Influencing Data and Information Needs for Research Resource Management in National Research Institutions
1245-1400 Hours :	LUNCH BREAK
1400-1500 Hours :	Institutional Organisation and Processing of Data and Information for Research Resource Management in National Research Institutions
1500-1530 Hours :	COFFEE BREAK
1530-1700 Hours :	Data and Information Needed for Financial Resource Management
1700 Hours	MEETING ADJOURNMENT

TUESDAY, 12 MAY 1992

Chairman: Dr. J. K. Omuse
Secretary: Mrs.T. S. Kesupile

0830-1000 Hours : Data and Information Needed for Human Resource Management

1000-1030 Hours : TEA BREAK

1030-1145 Hours : Data and Information Needed for Physical Resource Management

1145-1300 Hours : Data and Information Needed for Management of Information as a Resource

1300-1400 Hours : LUNCH BREAK

1400-1500 Hours : Data and Information Needed for Management of Time as a Resource

1500-1515 Hours : COFFEE BREAK

1515-1600 Hours : Consideration of Critical Issues on Data and Information Needs at Scientist, Institutional, National, Regional and International Levels

1600-1700 Hours : Cooperation and Networking for Collection, Storage and Processing of Data and Information on Research Resource Management

MEETING ADJOURNMENT

WEDNESDAY, 13 MAY 1992

Chairman: Professor R. Ahmed
Secretary: Dr. H. F. Bitanyi

0830-1000 Hours : Development of Survey Instrument and Guidelines for Data and Information Collection and Processing

1000-1015 Hours : TEA BREAK

1015-1200 Hours : Development of Recommendations and Follow-up Action Plan

1200-1300 Hours	:	Consultant and Secretaries Meeting
1300 Hours	:	CLOSURE
1300-1400 Hours	:	LUNCH
1400-1700 Hours	:	Free Consultations with IDRC Staff by Working Group Members

THRUSDAY, 14 MAY 1992

Commencement of Departures

Appendix #4

BUDGET ESTIMATES

A. Estimated Budget(US$) for a Regional Training Workshop on the Methodology and Procedure for Survey, Collection and Processing of Data and Information on Research Resources in National Research Institutions

Training Objective: to create a trained cadre of people in national research systems and institutions who could take lead in implementing the task of research resource management data and information collection and processing

Participation: 8 participants from Botswana, Kenya, Malawi, Mauritius, Mozambique, Tanzania, Uganda, Zimbabwe

Venue used for estimates: Nairobi(Kenya)/Kampala(Uganda)

Proposed Date: December 1992

Duration: 5 days (travel inclusive)

ITEMS	COST
Training Participants:	
Airfares (1x0) (2x450) (5x1250)	7150
Per diem (8x5x80)	3200
Resource Persons(local):	
Honoraria(2personsx$300)	600
Preparation of Training Material	400
Communication	100
Stationery, Photocopy and Secretarial services	250
Tea/Coffee($2.50x12peoplex3days)	90
Local Transport Hire	150
Consultant: Fees (35 daysx$200)	7000
Lunches(3daysx$15)	45
Total	18985

Appendix #4

B. Estimated Budget for Support of an Institutional Unit for Collection and Processing of Research Resource Management Data and Information for a nine month period

Emoluments:	
Project Officer(500x9m)	US$4500
Copy Typist(200x9m)	1800
Materials and Supplies	150
Communication expenses	100
Travel expenses	500
Training(computer use)	600
Computer	4000
Printer	1500
Power stabiliser	400
Typewriter	1300
Total	13950

C. Estimated Annual Budget for a Regional Resource Management Data and Informtion Subnetwork Coordinating Unit

RECCURENT COSTS	
Emoluments:	(US$)
Part-time Coordinator(800x12)	9600
Secretary(600x12)	7200
Travel: Inland (12mx500)	6000
Regional: Airfares(2x2000)	4000
Per Diem(30daysx100)	3000
Communication	400
Materials and Supplies	500
Annual Working Group Meeting	8000
sub-total	38700
CAPITAL EXPENDITURE	
Equipment: Typewriter	1300
Filing Cabinet	150
Computer	4000
Printer	1300
Power Stabilizer	400
Furniture(Desk, Chairs etc)	500
sub-total	7650
HOST INSTITUTION/COUNTRY CONTRIBUTION	
Office accomodation	
Utilities(electricity, water)	
Total	46350

D. Estimated Budget for Director of Research Seminar on the Role of Data and Information in Planning at the National and institutional Levels

Broad Objective: to sensitise and create increased awareness about role of data and information in strategic and operational planning of research research resources in national research systems and the methodology and procedures for survey, collection, analysis of storage of data for research resource management.

Participation: 15 people

Venue: Dar es Salaam

Proposed date: April 1993

Duration: 3 working days plus 2 travelling days

BUDGET

ITEMS	COST(US$)
Preseminar preparatory expenses:	300
Conference Expenses:	
Participants(Travel and Per diem)	26400
Resource persons (3 local)	900
Consultant(fees)	9000
(Airfares 2 trips)	1000
(per diem 15 days)	1500
Prepatation of Seminar material	200
Communication expenses(telex, postage)	100
Photocopying, stationery and secretarial services	200
Tea/coffee expenses	100
Local transport expenditure	150
Total	39550